Game Theory and the Effects of Age on Cooperation

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Abstract

Cooperation is an important behavior because it can affect all aspects of life (Sandholm and Crites 1996; Kagel and McGee 2016; Cohen etal. 1999). The Prisonor's Dilemma is a classic game theory game of cooperation (Falk and Fischbacher 2006). It shows that pure cooperation is a better strategy than pure non-cooperation, but that cheating when others try to cooperate is even better. Here, we wanted to test the effects of age on cooperation in a prisoner's dilemma game. We did this by having individuals play two types of simple card games – one called Section A and the other called Section B. Section A was where a player played different partners in each round, while in Section B a player played the same partner repeatedly. Our focal subjects were "college students" and "elderly people." Our hypothesis is that elderly people will cooperate more than college students. However, our results suggest the opposite occurred, with college students cooperating more than elderly people.

Purpose

The purpose of this research is to look into the effects of age on cooperation. We also wanted to test and see if their way of playing changed depending on the type of game that they were playing.

Questions, Hypotheses, and Predictions

Question: The question is whether or not there are difference between age groups in their level of cooperation and whether they change the way they play games depending on the type of game.

Hypothesis: We expect the older generation to cheat less and cooperate more.

The Prisoner's Dilemma Game

Here is a simple explanation of a prisoner's dilemma game. To begin with, the pay-off matrix looks as follows, where T>R>P>S.

		Player B: Cooperate	Player B: Don't Cooperate
Player A	Cooperate	R Reward	S Sucker
	Don't Cooperate	T Temptation	P Punishment

Our game follows this pattern, where both players cooperating yields a reward ($1) that is better than both players not cooperating ($0). However, the "temptation" to cheat is high, as it has the highest payoff ($2).

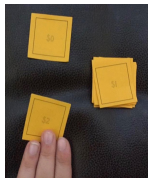
		Player B: Cooperate	Player B: Don't Cooperate
Player A	Cooperate	$1 Reward	- $2 Sucker
	Don't Cooperate	$2 Temptation	$0 Punishment

Methods and Experimental Design

The materials that we used for our research were cards that had $0,$1,and $2 printed on them. These were to be substitutes for real money, since the name of the game is the "Let's Make Money Game". We tested different age groups to see if there was a difference in how they played. The two age groups that we used were college students and elderly people

The way that we tested them was by them playing two different versions of the "Let's Make Money Game". How we went about this was that we had them play Section A and Section B. Section A is played by having one person play different people a number of times (10 times in this case). Where as Section B is played with two people playing each other repeatedly (10 times).



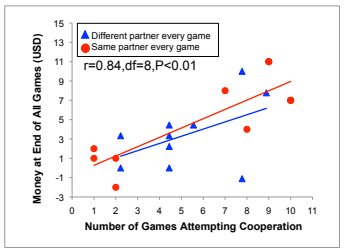



The object of the game is pretty simple, and it is to make the most money. The rules of the game however are a little more complicated. The rules of the game are that when two people play a $0 card (i.e., neither cooperates) the result is no money for either player. When both players play the $2 card they are cooperating, so they get to keep their two dollars as well as take a $1 card (i.e., the reward). However, in the event that one person plays a $2 card and the other plays a $0 card, the person who played $0 gets to take their opponents $2 card (i.e., the payoff from the temptation to cheat). The reason for this is because they cheated the other person out of their money, therefore the person who played $0 card gains that two dollars and the person who got cheated loses their money. Section A was the section where everyone plays different people, but still playing ten rounds with a different person each round. Section B was the section where each person picked a partner and they played 10 rounds with the same person.

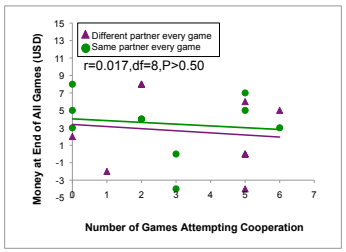
Results

What we found was that there was a difference between the two generations, and that the elderly people cheated more then the college students. Something else that we found was that both groups played the same in both Section A and Section B, so the type of game did not change their behavior.

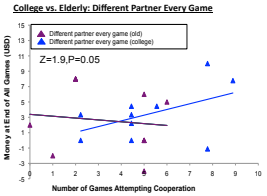
College Students: Different Games



Elderly: Different Games



College vs. Elderly: Different Partner Every Game



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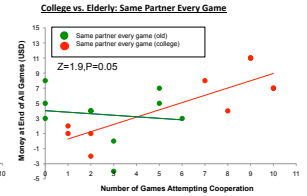

Conclusions

We concluded from the data that the elderly people were more likely to cheat than the college students. Many factors could play into why the elderly were more likely to cheat. As for how each age group played the different games, there were no differences. This is different than previous research which suggest that cooperation should be more common in games where players play each other repeated.

Future Directions

In the future, we would like to see what results we would find if we studied the differences in gender. One thing we noticed when collecting our data was that both age groups were primarily female. If we were to do this same experiment again, we would get a variety of men and women and compare the data from the two groups. It would be interesting to see if there was a difference between the genders and see if there would be a difference in the data. To add onto that, it would be interesting to see if there was a difference in age associated with gender, with females cooperating less with age and males more with age.

References

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